REMARKS

The present amendment is in response to the office action mailed on December 19, 2003 and includes a request for a two month extension in the due date for a response and a Request for Continued Examination (RCE) under 37 CFR §1.114 .

Claims 1-4, 6, 7 and 10-57 are pending in the application. Claims 32-42 are withdrawn. In the present amendment, withdrawn claims 32-42 are cancelled without prejudice and claims 31, 45, 48, 49 and 54 are amended to correct minor informalities.

In the Office Action the Examiner states that claims 1-4, 6, 7, 10-31 and 43-57 are rejected under 35 USC 103 as being anticipated by US 6,218,769 to Iino. Whereas the USC 103 rejection implies rejection based on obviousness, the applicants assume that the rejection is based on anticipation, both because such is stated and because the Examiner has not proffered any prior art or knowledge in addition to the Iino patent on which to base the rejection. Applicants respectfully traverse the rejection.

The Examiner supports the anticipation rejection by noting, "Iino teaches a piezoelectric actuator made of laminated rectangular plates having quadrant electrodes on one side of at least one plate. Electrodes are electrified so as to produce longitudinal and bending vibrations; "and both elongation and contraction vibration and bending vibration can separately be controlled—" (See col. 2, lines 30-38)."

Claim 1 of the present application recites that a "power supply controls electrification to independently control excitation of longitudinal and transverse vibrations *so as to selectively generate different forms of vibratory motion in the vibrator.*" As noted in applicants' response of October 7, 2003 to the Office Acton dated May, 15, 2003, Iino nowhere teaches *a power supply that controls electrification to generate different forms of vibratory motion.* In fact, applicants contend, as discussed below, that Iino teaches away from such a power supply.

Iino teaches a multilayer piezoelectric motor having layers, "longitudinal layers", dedicated to exciting longitudinal vibrations in the motor and layers, "transverse layers", dedicated to exciting transverse vibrations in the motor. The longitudinal and transverse vibrations generate elliptical vibrations that transmit motion to a body to which the motor is coupled. The longitudinal layers are driven by a same AC voltage and the transverse layers are driven by a same AC voltage.

Iino teaches consistently and exclusively that the AC voltages applied to the longitudinal and transverses layers have a same magnitude and are either, in phase or 180° out of phase. When the voltages are in phase, the motor executes elliptical vibratory motion in

a first sense (*i.e.* either clockwise or counterclockwise) to provide motion to a moveable body in a first direction. When out of phase, the motor executes elliptical vibratory motion in a second, opposite sense (respectively counterclockwise or clockwise) to provide motion in a second direction, opposite to the first direction. Phase reversal is accomplished by maintaining the phase of voltage applied to either the longitudinal or transverse layers fixed and *separately controlling* the phase of voltage applied to the other layers, respectively the transverse or longitudinal layers, to be either in phase or out of phase with the fixed phase.

Methods of electrifying and operating a piezoelectric motor in accordance with the Iino patent and limitations thereof as described above are noted in various parts of the patent. In the summary of the invention, Iino states (column 3, lines 61-63), "*According to the invention, the ultrasonic motor is driven by a single one of an input signal* (applied as is, or with reversed phase to layers in the motor) and accordingly a self-excited oscillation circuit is simplified...". (Parenthetical remark added.) The teaching is repeated for each of the only three different embodiments of a motor provided by Iino, *e.g.* column 2 lines 30-38 referenced by the Examiner, and column 10 lines 51-54, column 16 lines 1-3, and column 20 lines 36-39 for the first, second and third embodiments respectively. For a fourth embodiment, which teaches apparatus comprising a motor in accordance with the invention, the teaching is recited in column 22 lines 39-42. The methods are illustrated in Figs. 4B, 8C, and 11. Nowhere in the frequent descriptions of how a piezoelectric motor according to Iino operates does Iino teach or imply in any manner adjusting power supplied to the layers for any purpose other than for reversing phase of voltage applied to either the longitudinal or transverse layers in order to reverse direction of elliptical vibration of the motor.

Applicants acknowledge that Iino teaches that longitudinal and transverse vibrations "can separately be controlled", which might appear, if not explicitly, to inherently comprise generating different forms of vibratory motion by controlling electrification. However, given the restrictions that Iino repeatedly teaches with respect to the AC voltages applied to the longitudinal and transverse layers, the electrification of the layers is not *and cannot* be adjusted to change the form of motion provided by an Iino piezoelectric motor. In this regard, applicants point out that whereas reversing the phases of the longitudinal and transverse vibrations changes a sense of vibration motion, the phase reversal does not and cannot change *the form of vibratory motion* provided by the piezoelectric vibrator. Iino cannot therefore be interpreted as teaching or implying the limitation of *controlling electrification to generate different forms of vibratory motion* recited in claim 1 of the present application.

Nor can Iino's use of the phrase "can separately be controlled" be extended to encompass controlling electrification to generate different forms of vibratory motion. For each embodiment of the Iino invention, Iino clearly and narrowly restricts "can separately be controlled" *to separately controlling the phase of voltage applied to one of the groups of longitudinal or transverse layers while maintaining the phase of voltage applied to the other of the groups in order to reverse direction of the motor.*

For the first and second embodiments of a piezoelectric motor, Iino presents "can separately be controlled" in a sentence, which begins with, "In this way", and goes on to characterize "can separately be controlled" as "separately setting and changing the reference potential" (column 10 lines 30-40 and column 15 lines 47-56). For each of the embodiments "In this way", refers the reader to a preceding description of operation of the motor in which the patent describes how phase of voltage applied to the longitudinal layers (or alternatively, to the transverse layers) is reversed while phase of voltage applied to the transverse layers (alternatively, the longitudinal layers) is maintained. Phase of voltage is reversed by changing electrification of the longitudinal (transverse) layers so that electrodes in the layers electrified with a reference potential (shown as ground) become electrified with a "power potential" and electrodes electrified with the power potential become electrified with the reference potential. The purpose of reversing the reference potential in both embodiments is to reverse direction of motion of a body to which the motor is coupled (column 10 lines 27-29 and column 15 lines 44-46). *Separately setting and changing the reference potential and thereby "can separately be controlled"* cannot be understood except as referring only to a method of reversing voltage phase of one of either the longitudinal or transverse layers while maintaining the phase respectively of the other of the transverse or longitudinal layers.

For the third embodiment, Iino presents "can separately be controlled" in a sentence also beginning with "In this way", which characterizes "can separately be controlled" as "separately setting and changing the input signal" to the longitudinal and to the transverse layers (column 20 lines 16-24). "In this way", refers the reader to a preceding description of operation of the motor in the third embodiment in which phase of voltage applied to the longitudinal layers (or alternatively, to the transverse layers) is reversed while phase of voltage applied to the transverse layers (alternatively, the longitudinal layers) is maintained, in order to change "the direction in which the ultrasonic motor 3 moves the moving body 34a" (column 20 lines 11 and 12). Phase of voltage is described as being reversed by a phase inverter circuit which inverts (*i.e.* changes phase by 180°) the phase of voltage applied to longitudinal (alternatively transverse) layers. *Separately setting and changing the input signal ..*" *and*

thereby, "can separately be controlled" in this case must be understood as referring only to a method of reversing voltage phase of either the longitudinal or transverse layers while maintaining the phase of respectively the transverse or longitudinal layers.

In all of the Iino embodiments, phase reversal, either by "setting and changing" the reference voltage or by "changing" the input signal, refers only to reversing the direction of motion provided by the motor, and, as noted above, does not, and cannot, incorporate a change in the form of motion provided by the motor.

Applicants further note and acknowledge that Iino teaches, not explicitly, but inherently, a method of controlling longitudinal and transverse vibrations of a multilayer piezoelectric motor *that does generate different forms of vibrations in the motor.* The method, referred to as controlling the vibrations *independently*, is apparently distinct from controlling the vibrations "separately" - which is used exclusively with reference to changing phase as discussed above. In accordance with Iino, the "two vibration forces" (*i.e.* the longitudinal and transverse vibration forces) can be *controlled independently of each other by changing a ratio the number of longitudinal to transverse layers* (column 11 lines 6-12, column 16 lines 15-18 and column 20 lines 58-61). Changing the ratio of the layers will in general change a ratio of the major to minor axes of the elliptical motion executed by an Iino piezoelectric motor, and will therefore change the form of motion performed by the motor. However, Iino does not suggest anywhere that control of the vibration forces can be executed by controlling electrification of the layers. Applicants contend that by omission, Iino teaches away from controlling the forces by controlling electrification.

In view of the above remarks, applicants submit that Iino does not anticipate claim 1, nor, for at least the same reasons, independent claims 55-57. Dependent claims presently pending are patentable at least through their dependence on claim 1. Applicants respectfully request that the Examiner carefully review applicants' arguments and reconsider his rejection of the claims presently pending.

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